

What is claimed is:

1. A depth measuring apparatus for, with regard to a sample that includes a test subject having fluorescence within the sample and that has transmittance along at least a depth that is a measurement range, obtaining depth distance information of the test subject within the sample, with a position of a surface of the sample as a reference, the apparatus comprising:

a light emitter including a point light source, for converting light from the point light source to a parallel light beam having an excitation wavelength causing only the test subject within the sample to emit fluorescence;

an objective lens, provided freely movable in a light axis direction of the objective lens, for condensing a parallel light beam from the light emitter onto a measurement spot of the sample, the objective lens converting light from the measurement spot of the sample into a parallel light beam;

a mover for moving the objective lens in its light axis direction;

an image forming lens for forming an image of light from the measurement spot of the sample obtained via the objective lens;

a confocal aperture, placed at a position optically conjugate to the point light source and a focal point position of the objective lens via the objective lens and the image forming lens, which is an image formation position of the image forming lens, for substantially passing only light from the focal point position of the objective lens;

a surface scattered light information acquirer for detecting an amount of light passing through the confocal aperture and having a wavelength equivalent to the excitation wavelength, while the focal point position of the objective lens is being moved by the mover;

a fluorescence information acquirer for detecting an amount of light passing through the confocal aperture and having a wavelength equivalent to the fluorescence wavelength, while the focal point position of the objective lens is being moved by the mover; and

a distance information acquirer for obtaining at least relative distance information in the light axis direction between a position of the objective lens where a light amount detection value of surface scattered light by the surface scattered light information acquirer is maximum

and a position of the objective lens where a light amount detection value of fluorescence by the fluorescence information acquirer is maximum, wherein

depth distance information of the test subject within the sample is acquired based on the relative distance information obtained by the distance information acquirer, with a position on a surface toward the objective lens of the sample as a reference.

2. The depth measuring apparatus according to claim 1, wherein the objective lens and image forming lens are lenses without chromatic aberrations.

3. The depth measuring apparatus according to claim 1, wherein the light emitter comprises:

an excitation wavelength selector for passing only light having a wavelength equivalent to the excitation wavelength causing only the test subject within the sample to emit fluorescence among the light from the point light source; and

a collimator lens for converting light from the point light source to a parallel light beam, wherein

a portion between the collimator lens and the objective lens is a parallel light beam portion.

4. The depth measuring apparatus according to claim 3, wherein the portion between the objective lens and the image forming lens is a parallel light beam portion, and wherein a half mirror is provided in the parallel light beam portion between the collimator lens and the objective lens, a parallel light beam from the collimator lens being incident on the objective lens via the half mirror, and light from the measurement spot of the sample obtained by the objective lens being incident on the image forming lens via the half mirror.